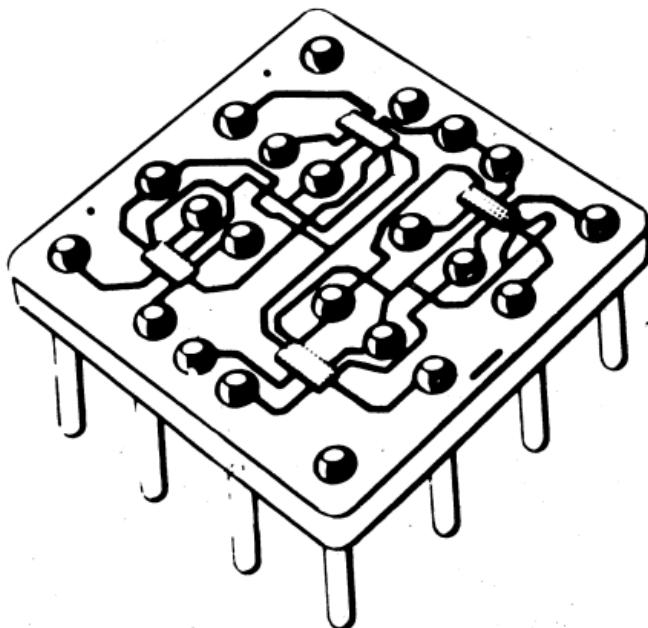


IBM

2-6400-H2

**MST-2
Module Data**



IBM Confidential

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Revised Edition, April 1970
Third Printing, December 1972
Fourth Printing, April 1974

1. INTRODUCTION

This pocket-size document has been published as a reference design handbook for users of the MST-2 circuit family. It contains a summary of information on the MST-2 family and is intended to serve as a reference supplement of the MST-2 Circuit Operation Book 03-08,

The complete MST-2 module set is presented as it appears at the time of publication of this document. This document will be revised on a periodic basis to insure an accurate and current content.

Any questions concerning the content of this document should be directed to MST Circuit Applications, Department 789, IBM East Fishkill.

Distribution of this document is on a need-to-know basis, controlled by the Circuit Technology Managers at their location.

II. GENERAL

MST-2 provides a system designer with a versatile monolithic circuit family having a typical "packaged" performance of 6 - 8ns.

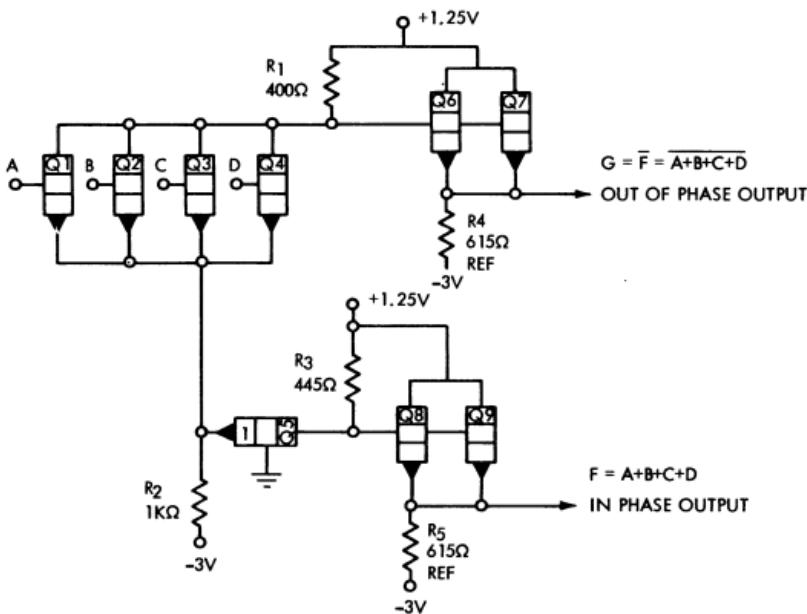
A high packaging density is achieved by the use of integrated circuit chips on 16 pin SLT modules and "SLT-like" cards with improved wireability.

Improved second level packaging is achieved by double layer boards and direct wiring via Tri-lead cable.

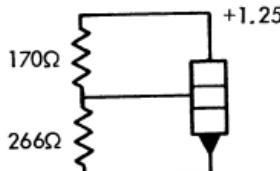
The basic circuit family utilizes a +1.25V and -3V power supply.

III. BASIC MST-2 CIRCUIT

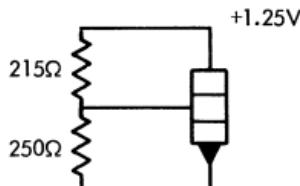
BASIC MST=2 CIRCUIT



When the out-of-phase clamp is used R_1 is replaced by network:



When the in-phase clamp is used R_3 is replaced by network:



IV. OUTPUT LEVELS

Voltage Levels

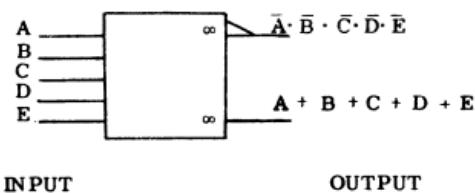
MPUL .675V

LPUL .230V

LNDL -.240V

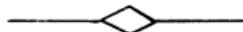
MNDL -1.260V

A. Current Switch



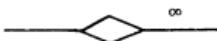
The block notation represents the basic current switch function and, unless otherwise noted within the block, is considered to perform the OR function. The presence of an infinity sign within the block implies no clamp circuit at the adjacent output.

B. Emitter Follower



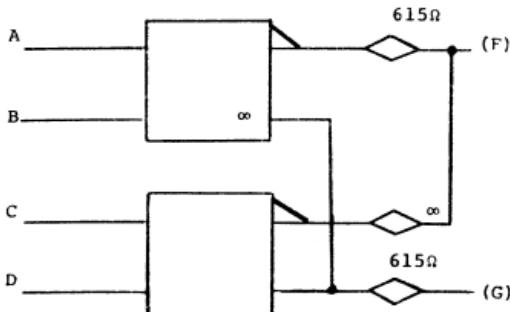
As the **MST-2** circuits may be internally collector dotted to perform the AND function, the diamond symbol is employed to distinguish between collector and emitter dots and the presence or lack of an emitter follower at the block output.

C. Emitter Follower Load State



The symbol adjacent to the diamond denotes the load state of that emitter follower, e.g., ∞ implies an unloaded emitter, 615Ω implies an emitter loaded internally with 615Ω .

D. Dot Functions



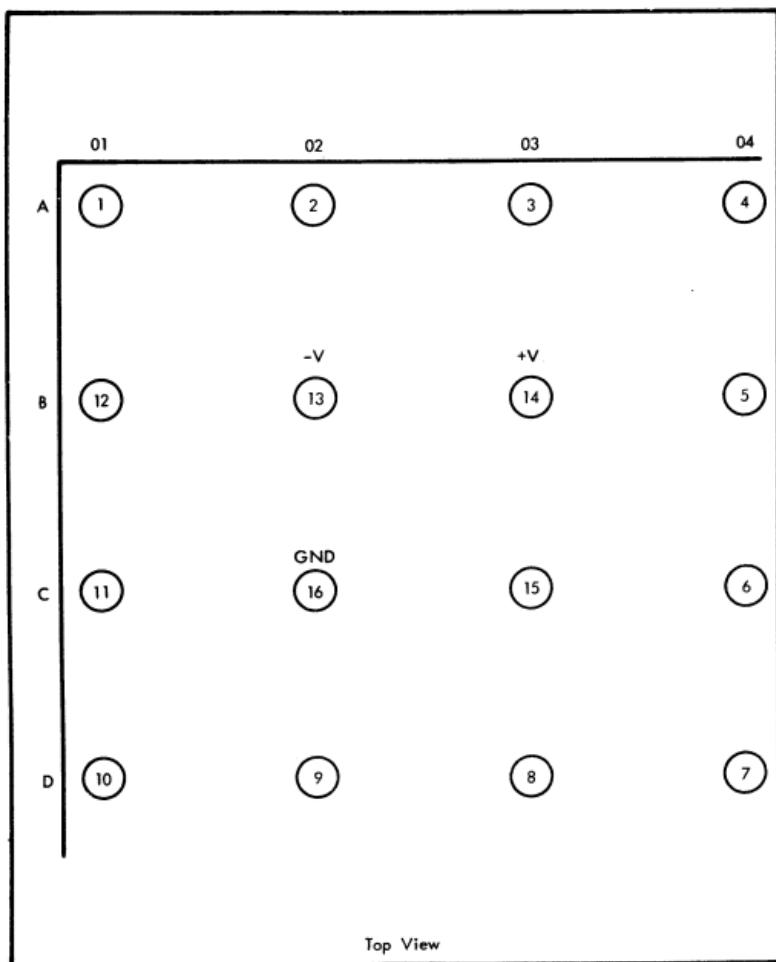
The dotted connection outside the emitter follower represents the DOT-OR connection, e.g.

$$\mathbf{F} = \bar{\mathbf{A}}\bar{\mathbf{B}} + \bar{\mathbf{C}}\bar{\mathbf{D}}$$

The dotted connection inside the emitter follower represents the collector DOT-AND function, e.g.

$$G = (A + B)(C + D)$$

VI. MODULE PIN NUMBERING



VII. MST-2 MODULE SET

Module P/N	Description
253 1829	6 (2w $\bar{\phi}$)
253 1830	3 (3w ϕ)
254 1831	3 (3w ϕ)
253 1832	2 (4w both ϕ)
254 1833	3 (2-3wAO) $\bar{\phi}$
255 1834	4 (4w ϕ)
*254 1835/255-1858	(2-4w,1-3w) AO both ϕ
255 1836	3 (2-Turn On Polarity Hold)
*253 1837/255-1860	2 (3-Turn On Polarity Hold)
254 1838	4-(Exclusive OR)
255 1839	3 (2-2w AO Latch)
253 1840	6 (2w $\bar{\phi}$)
254 1841	1(2-3w AO) both ϕ , 1(2-2w AO) ϕ
*255 1844/255-1857	(3-3w,1-4w) AO both ϕ
255 1845	3-3w both ϕ
254 1846	[1(2-2w) AO, 1(1-2w,1-3w) AO] both ϕ
253 1847	2-3w ϕ , 1-4w ϕ
254 1848	6 (2w ϕ)
253 1849	2-Exclusive Or Latch
*255 1850/255-1859	(3-4w,1-3w) AO both ϕ
*253 1851/255-1861	(4-3w) AO, 2w $\bar{\phi}$
255 1852	2-D.C. Trigger
254 1853	3 (2-3w AO) $\bar{\phi}$
255 1854	(4) Polarity Hold
253 1855	2 4w OE Parity Tree
254 1856	3 (3w both ϕ)

Logic Support Module Set

254 1646	Multi-Purpose ϕ CS
253 1647	Multi-Purpose ϕ CS
255 1648	MST-1 to MST-2 Converter
	3-2w $\bar{\phi}$, 1-2w both ϕ
255 1649	MST-1 to MST-2 Converter
	2-4w both ϕ
255 1650	MST-2 to MST-1 Converter
255 1651	NPL/SLT to MST-1/MST-2 Converter
255 1652	Single Shot
255 1654	2-A.C. Trigger
255 1655	3-A.C. Trigger
255 1656	A.C. Trigger
239 5143	MST-1/MST-2/to SLD Converter
255 1658	CS to SLT/NPL Converter
255 1665	MST-1 to MST-2 Converter
	3-2w ϕ , 1-2w both ϕ
255 1899	Multi-Purpose In-Phase CS
	[4 (2w ϕ)]

* Second part number is selected module for faster speed. Refer to section 9 of document D98a.

VII. (A) MS-101 Module Chip Cross Reference

Module P/N	Chip P/N
253 1830	2393 830
254 1831	2393 831
253 1832	2393 832
254 1833	2393 833
255 1834	2393 834
254 1835	2393 835
255 1836	2393 836
	2393 900
253 1837	2393 837 2 Chip per Module
254 1838	2393 838
255 1839	2393 839
253 1840	2393 840
254 1841	2393 841
255 1844	2393 844
255 1845	2393 845
254 1846	2393 846
253 1847	2393 847
254 1848	2393 848
253 1849	2393 849 2 Chip per Module
255 1850	2393 850
253 1851	2393 851
255 1852	2393 852 2 Chip per Module
254 1853	2393 853
255 1854	2393 854 2 Chip per Module
253 1855	2393 855 2 Chip per Module
254 1856	2393 856
255 1899	2393 899

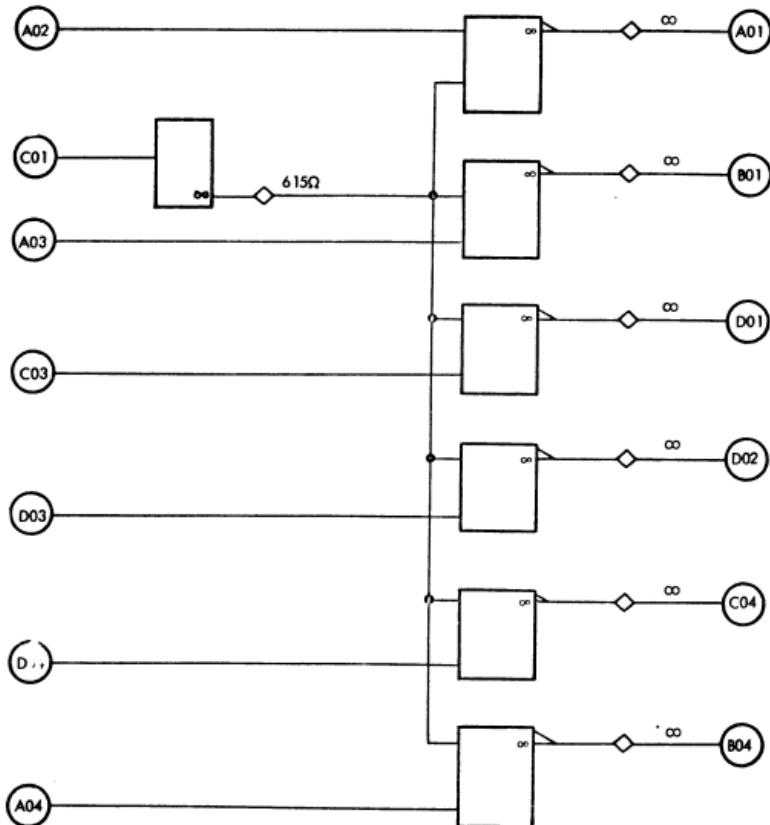
VII. (B) Module Power Dissipation and Max Can Temp.

Module P/N	Power Dissipation (mw MS 101)	# Circuits	Max. Can Temp. °C MS 101
253 1829	123	7	76
253 1830	91	3	77
254 1831	61	3	79
253 1832	88	2	78
254 1833	75	6	78
255 1834	122	4	76
254 1835	70	3	79
255 1836	269	13	74
253 1837	178	10	76
254 1838	159	8	74
255 1839	182	6	73
253 1840	213	7	71
254 1841	101	4	77
255 1844	110	5	77
255 1845	64	3	79
254 1846	122	4	76
253 1847	91	3	77
254 1848	213	7	71
253 1849	239	12	75
255 1850	80	4	78
253 1851	222	8	71
255 1852	365	12	72
254 1853	119	6	76
255 1854	281	12	74
253 1855	311	16	73
254 1856	154	3	74
255 1899	75	4	78

VII. (C) Basic Module Block Diagrams

P/N 2531829

$$6(2w\bar{\phi})$$



Same as P/N 2531840, without emitter resistors

Circuit Flyers

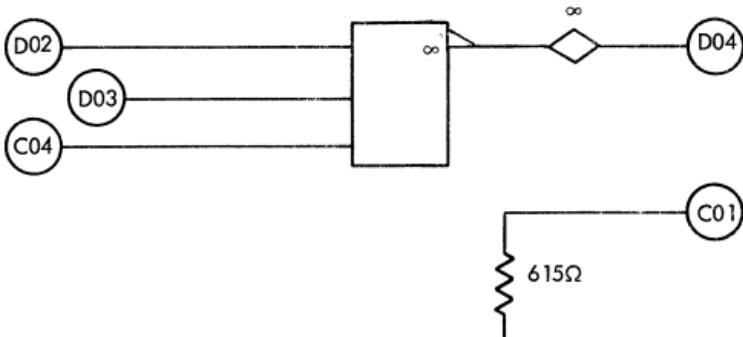
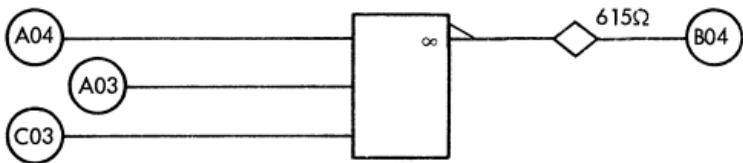
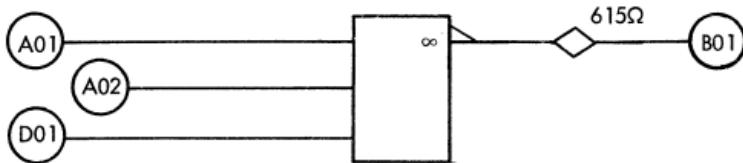
B02 -3V
B03 +1.25V
C02 GND

Module - 2400518
Combined - NA
Basic - ALAA8 ALAA6

VII. (C) Basic Module Block Diagrams

P/N 2531830

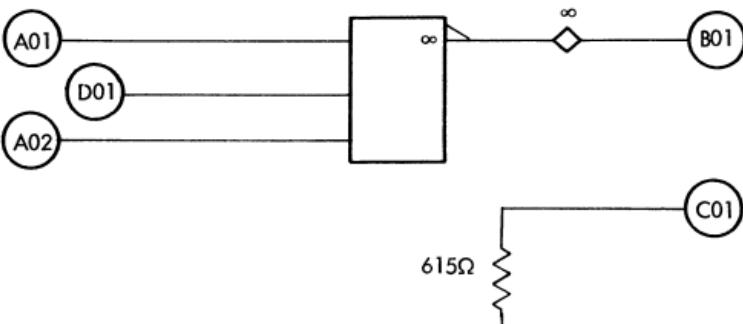
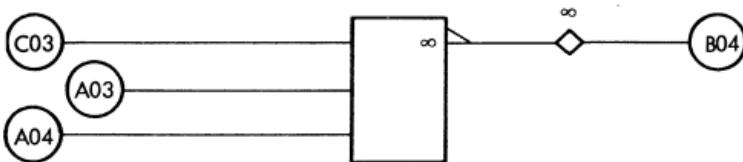
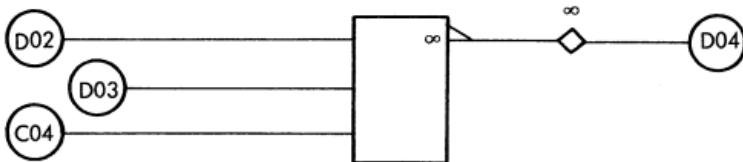
3 (3w $\bar{\phi}$)



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413876
Combined - NA
Basic - ALAA8
- ALAA0
- ACARE

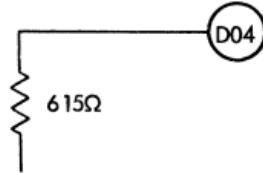
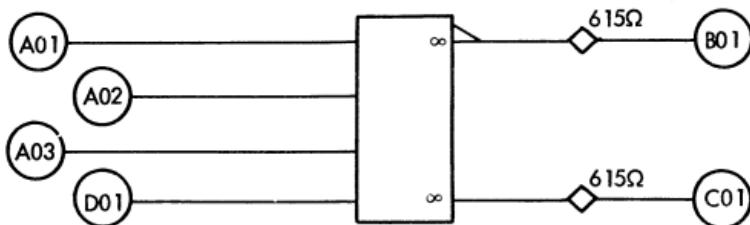
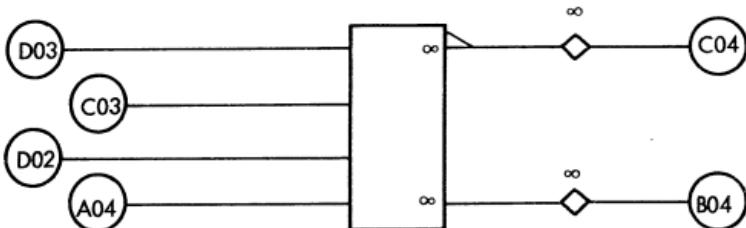
3 (3w ϕ)

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413877
 Combined - NA
 Basic - ALAA0
 - ACARE

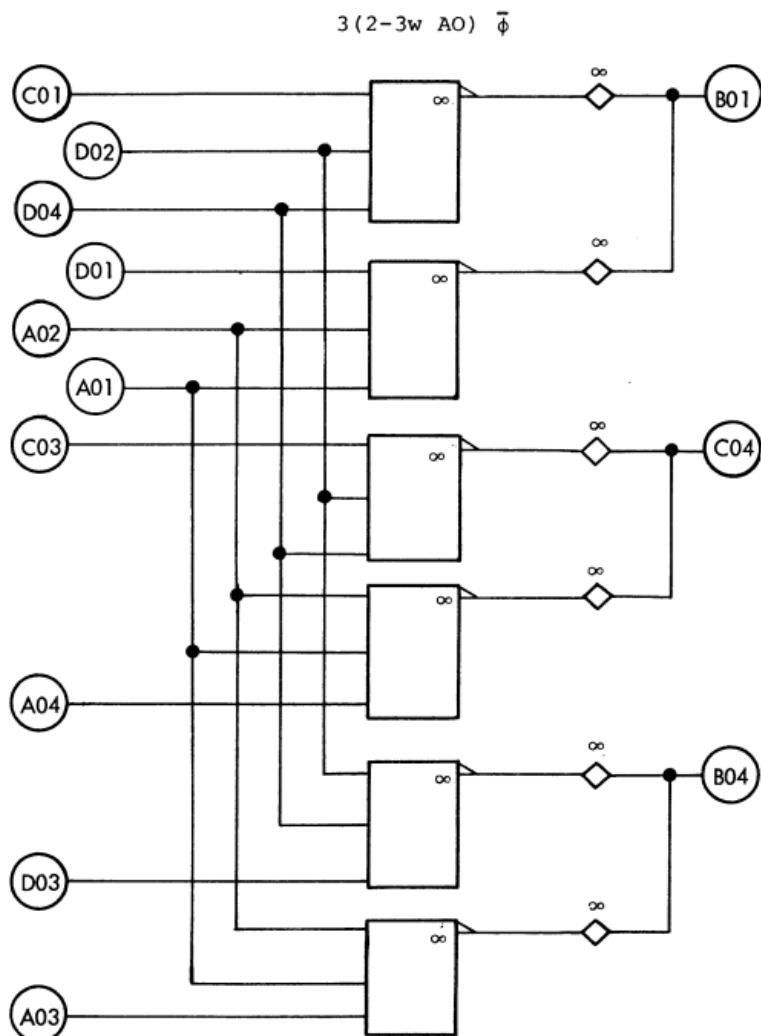
2 (4w both ϕ)



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413878
Combined - NA
Basic - ALAA0
- ALAA8
- ACARE



Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

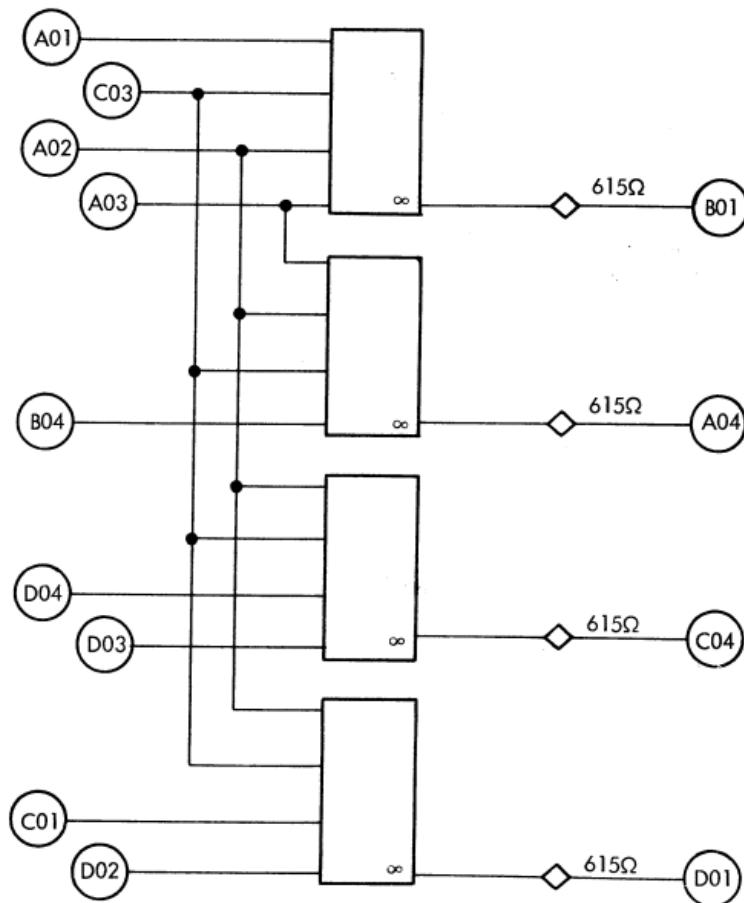
Module - 2413879
 Combined - AMA20
 Basic - ALACA
 - ALAAC

Pins A#2 and C#3 actually go to 4 bases. Design Automation, however, has been told (via flyer) that these pins represent only 3 bases each.

This representation is valid for AC wiring rule implementation only, and then only when certain conditions are fulfilled. It is the responsibility of the logic designer to assure himself that:

- 1) Counting these pins as four loads each, there are not more than ten loads on the nets involved, AND
- 2) During the time that either pin is going up (or down) in voltage, the other module inputs are so conditioned that pin A#2 or pin C#3 turns on (or off) not more than one of the four circuits on the module. A circuit is on when any one of its out-of-phase (input) transistors is on, and off when all of its out-of-phase transistors are off.

4 (4wφ)

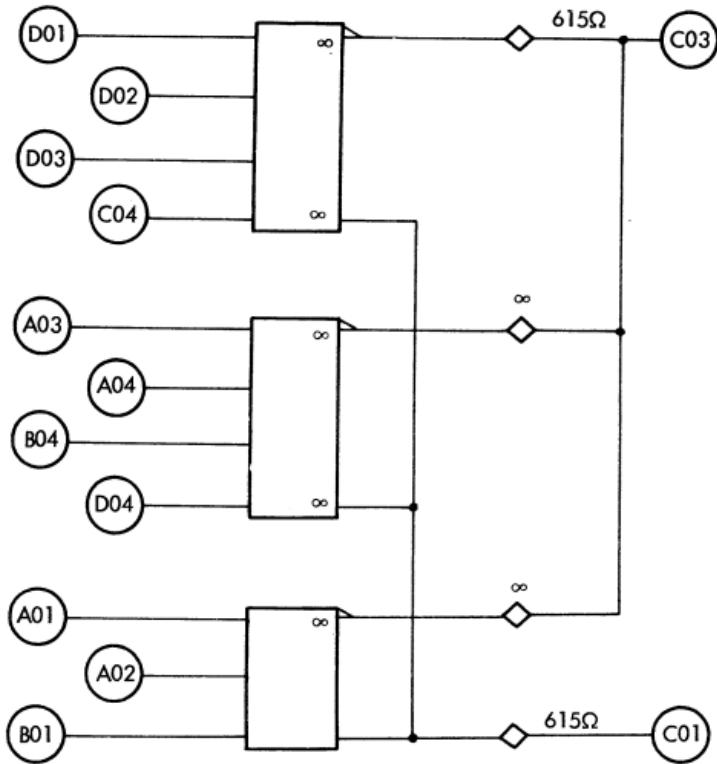


Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413880
 Combined - AMAG8
 Basic - ALAA0
 - ACARE

(2-4w, 1-3w) AO both ϕ

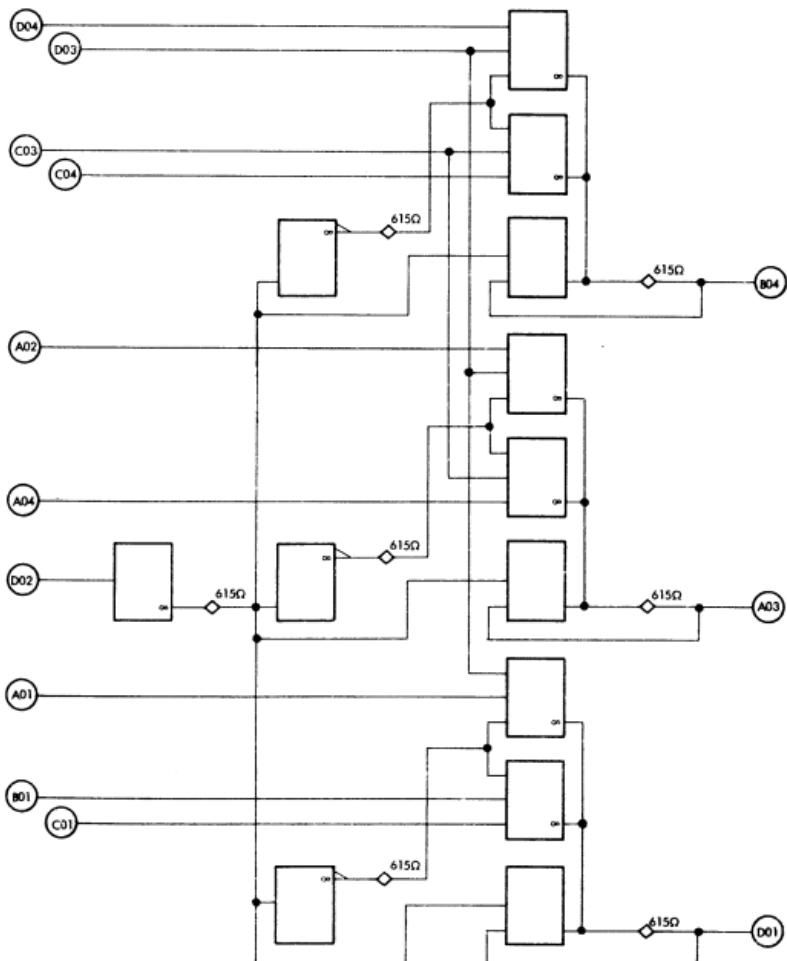


Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413881
Combined - AMA38
Basic - ALACA
- ALAAC
- ACARE

3 (2-Turn On Polarity Hold)

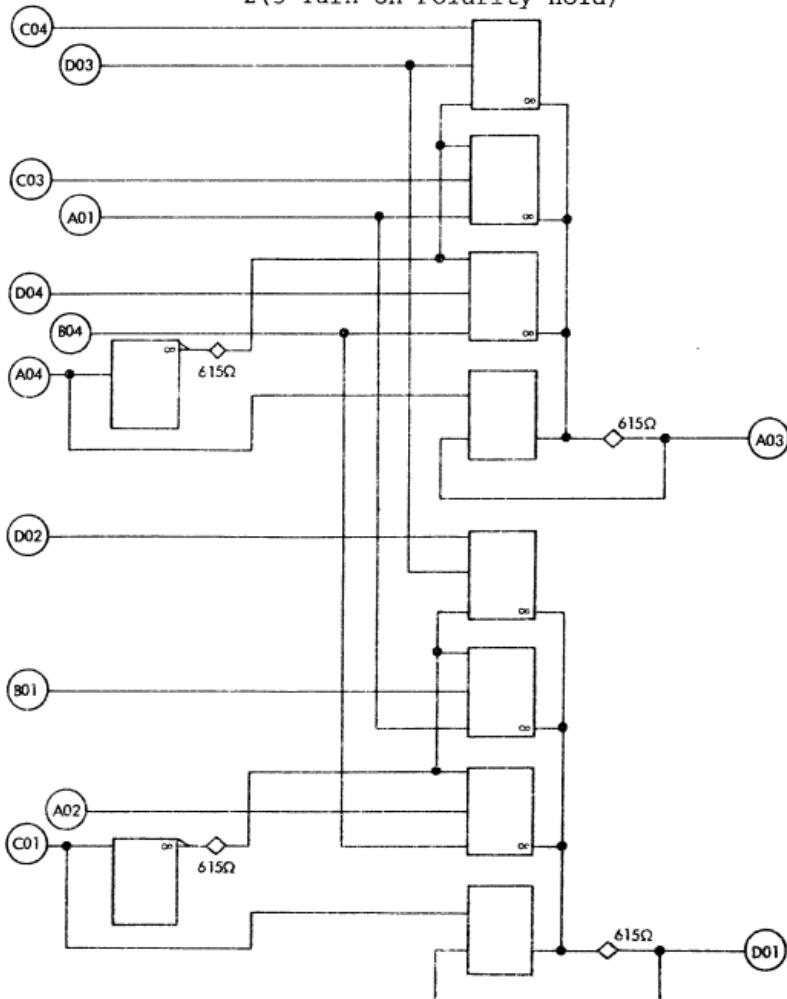


Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413882
 Combined - AFA38
 - ALAA8
 Basic - ALAA0
 - ALACA
 - ACARE
 - ALAAC

2 (3-Turn On Polarity Hold)

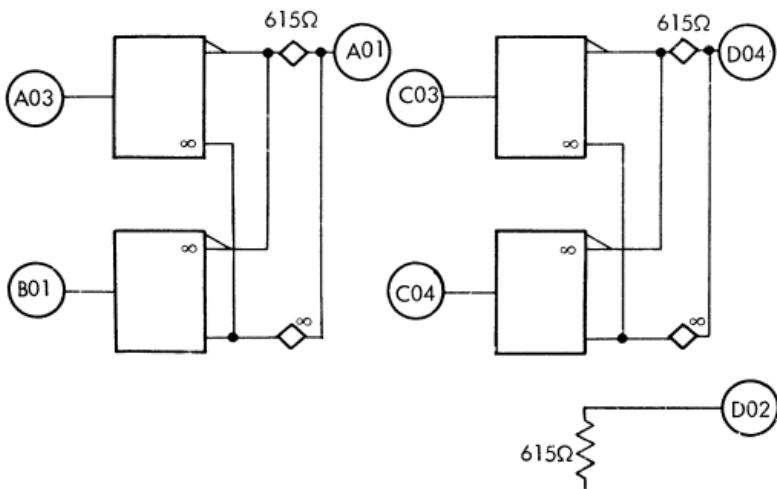
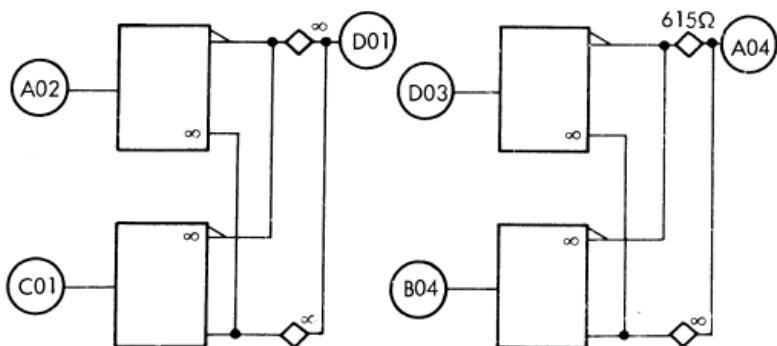


Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413883
Combined - AFA48
Basic - ALAAA0
- ALACA
- ALAAC
- ACARE

4 (Exclusive OR)

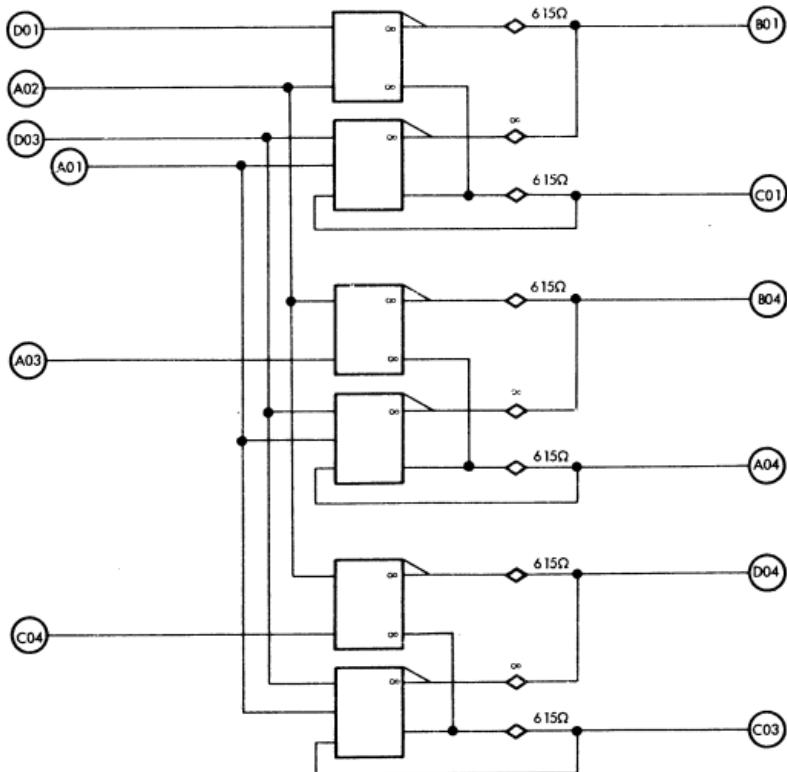


Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413884
 Combined - AUAEE8
 - AUAEO
 Basic - ALAAA
 - ALAAC
 - ALACB
 - ACARE

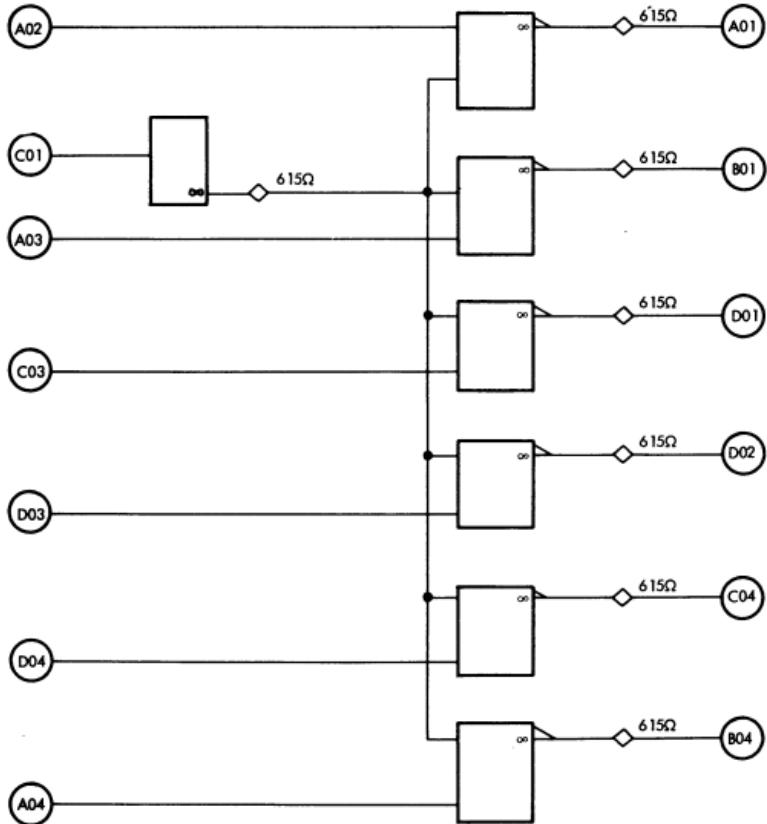
3 (2-2w AO Latch)



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413885
Combined - AMA28
Basic - ALAAC
- ALACA
- ACARE

6 (2w $\bar{\phi}$)

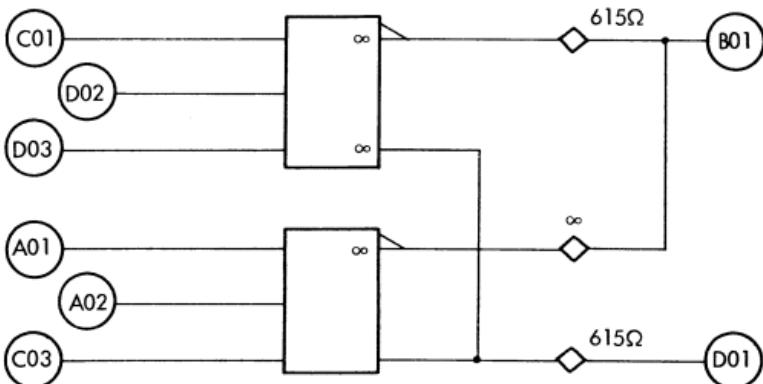
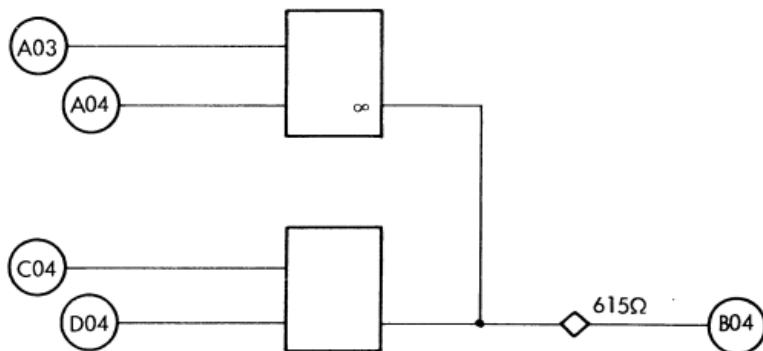
Same as P/N 253 1829, with emitter resistors.

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413886
 Combined - NA
 Basic - ALAA8

1(2-3w AO) both ϕ , 1(2- 2w AO) ϕ



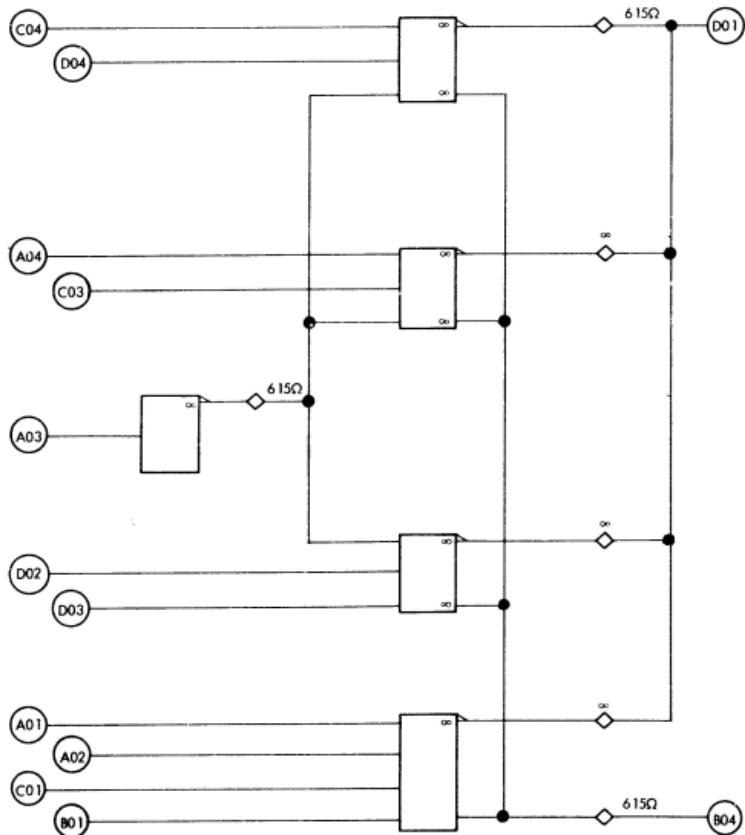
Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413887
Combined - AMA28
Basic - ALACA
- ALAAC
- ACARE

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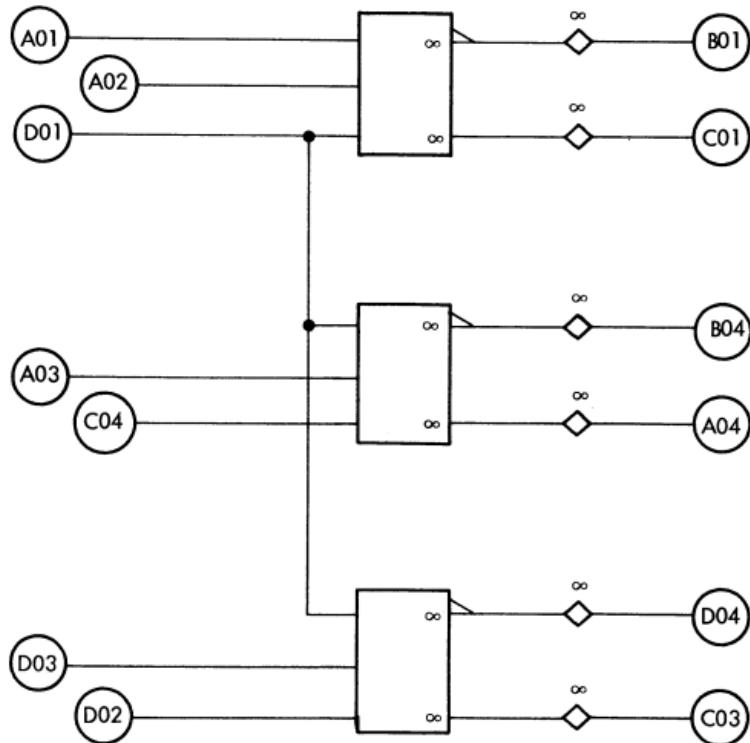
(3-3w, 1-4w) AO both ϕ



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413889
Combined - NA
Basic - ALAA8
- AMA48

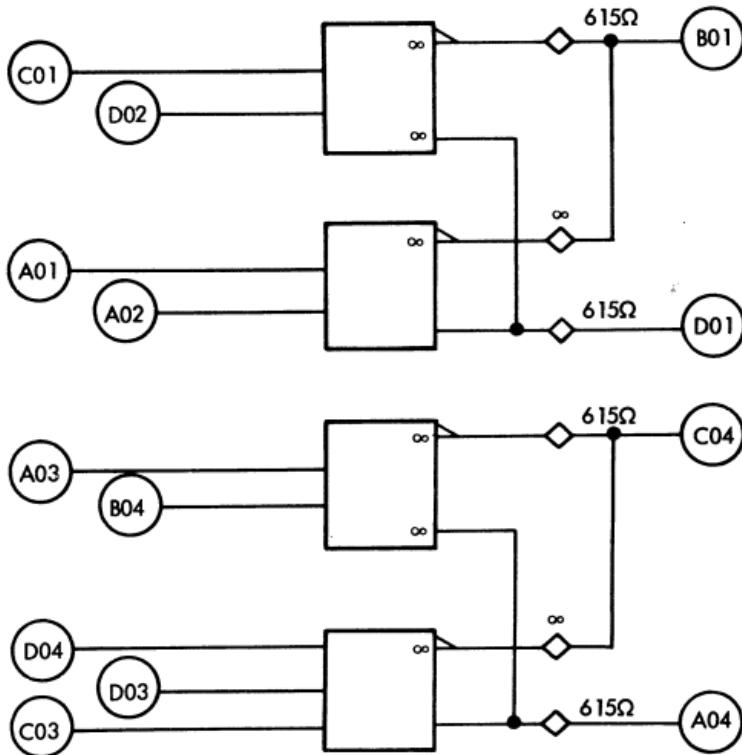
3-3w both ϕ 

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413890
 Combined - NA
 Basic - ALAA0

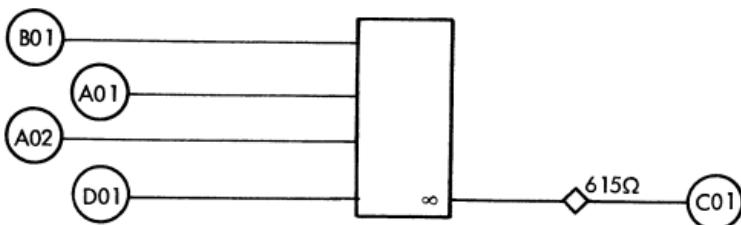
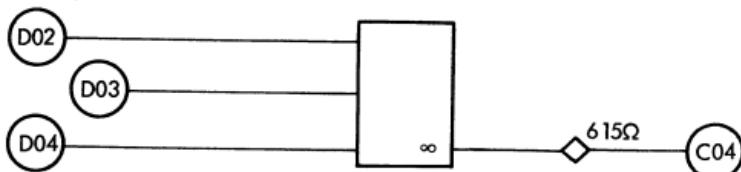
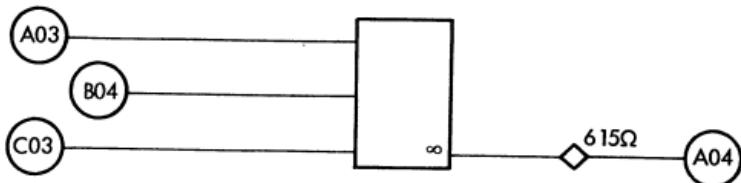
[1(2-2w) AO, 1(1-2w, 1-3w) AO] both ϕ



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

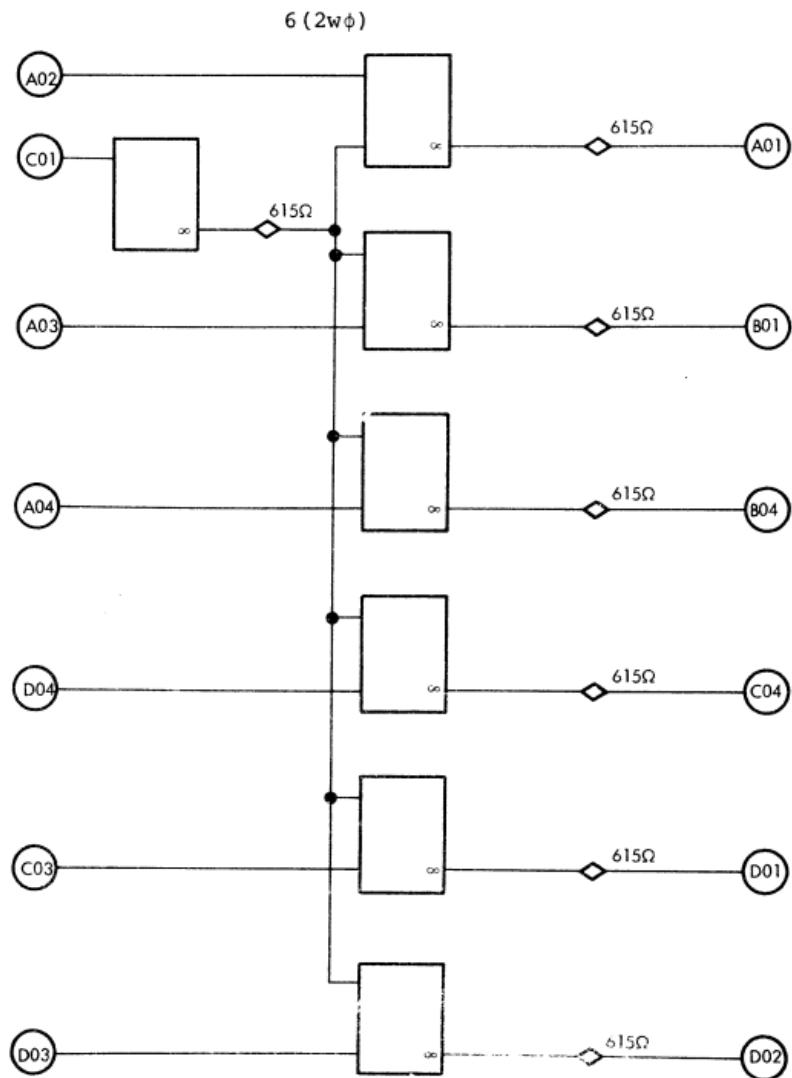
Module - 2413891
Combined - AMA28
Basic - ALACA
- ALAAC
- ACARE

2-3w ϕ , 1-4w ϕ 

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413892
 Combined - NA
 Basic - ALAA8

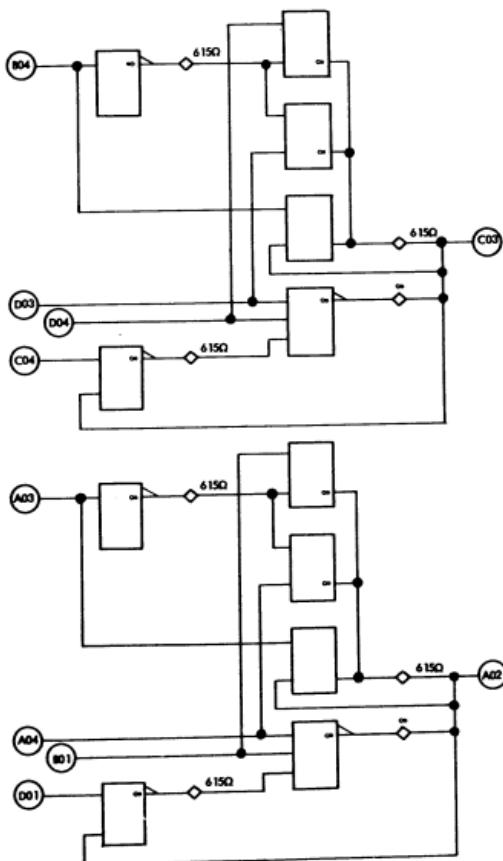


Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413893
 Combined - NA
 Basic - ALAA8

2-Exclusive OR Latch



Circuit Flyers

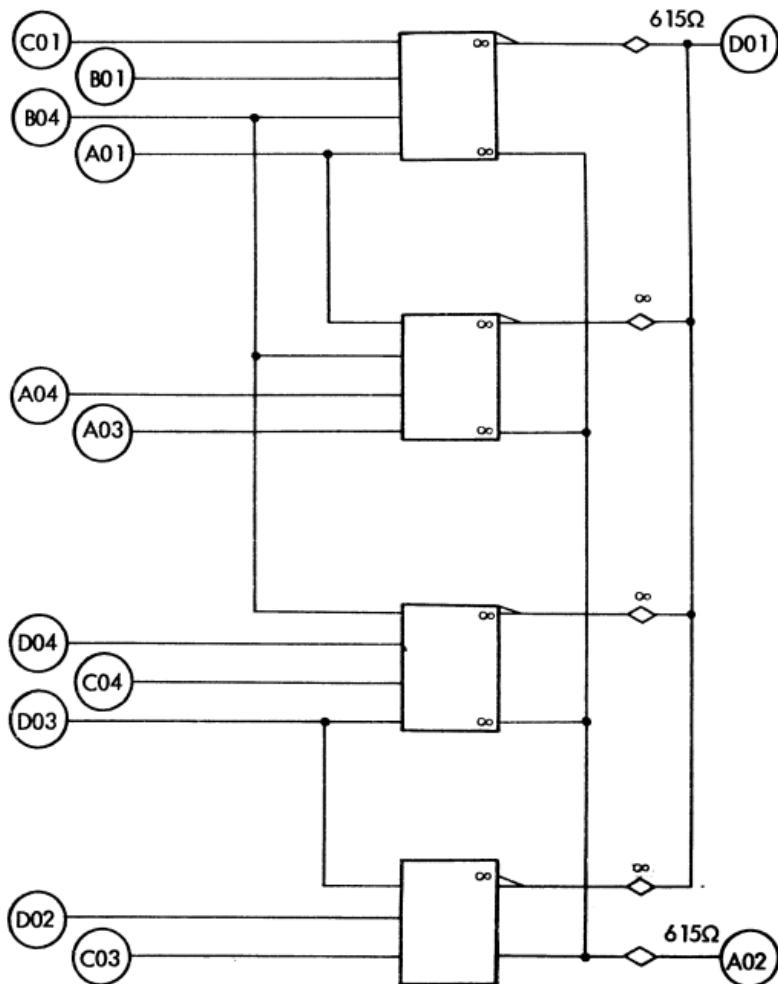
B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413894
 Combined - AMAE8
 Basic - ALAA0
 - ALACA
 - ACARE

Note: The following connections must be made:

Tie Pin C04 to B04
 Tie Pin D01 to A03

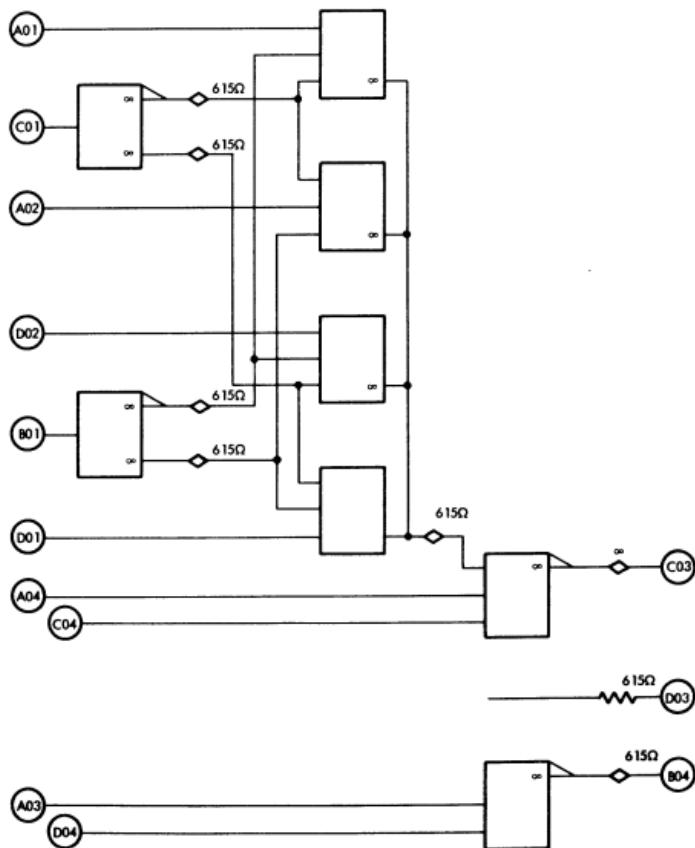
(3-4w, 1-3w) AO both ϕ



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413895
Combined - AMA48
Basic - ALACA
- ALAAC
- ACARE

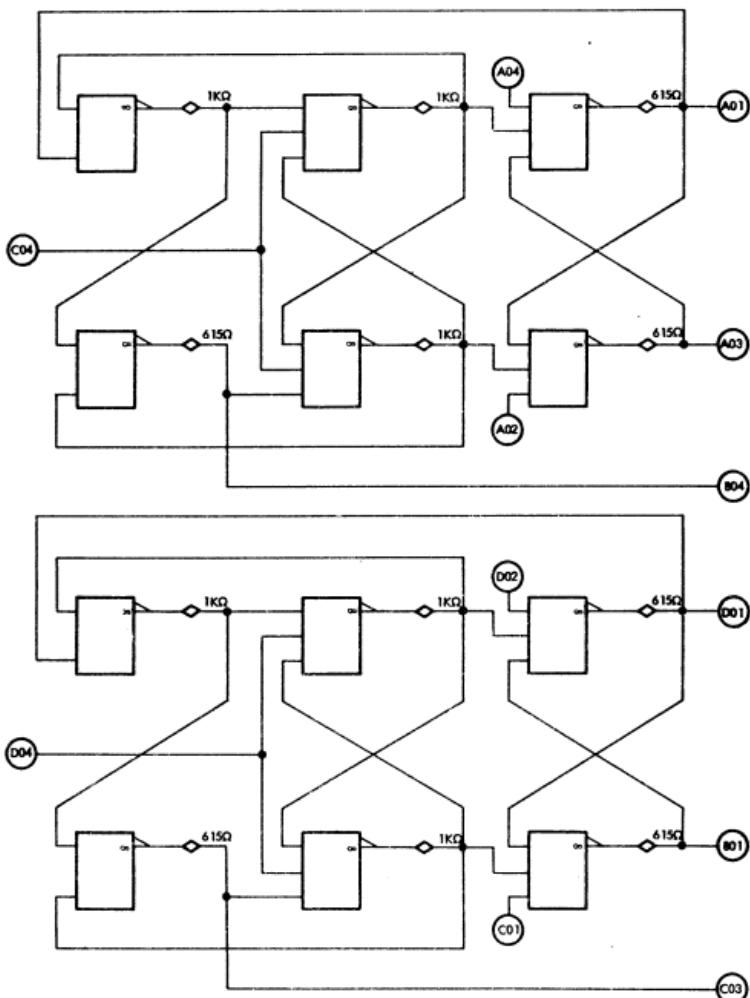
(4-3w) AO, 2w $\bar{\phi}$ 

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413896
 Combined - NA
 Basic - ALAA8
 - AMA48
 - ALAA0
 - ACARE

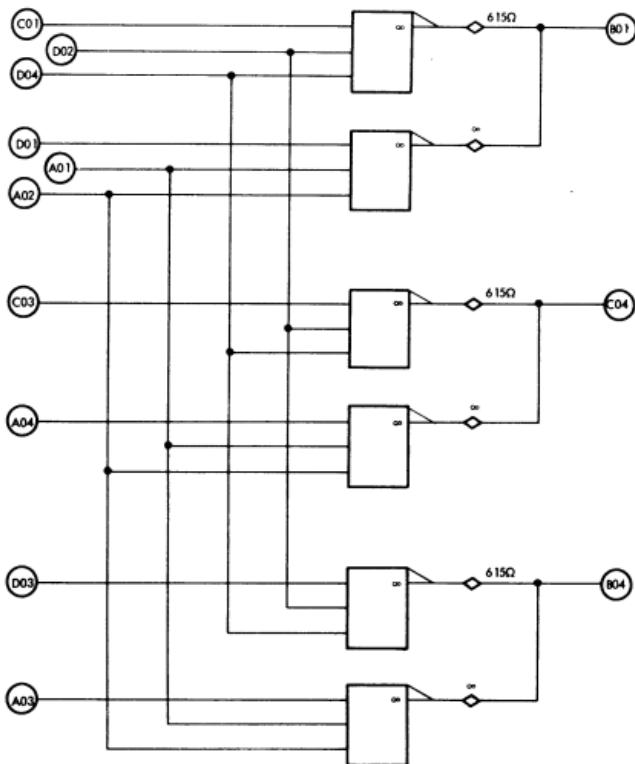
2-D.C. Trigger



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413897
Combined - NA
Basic - AFAA8

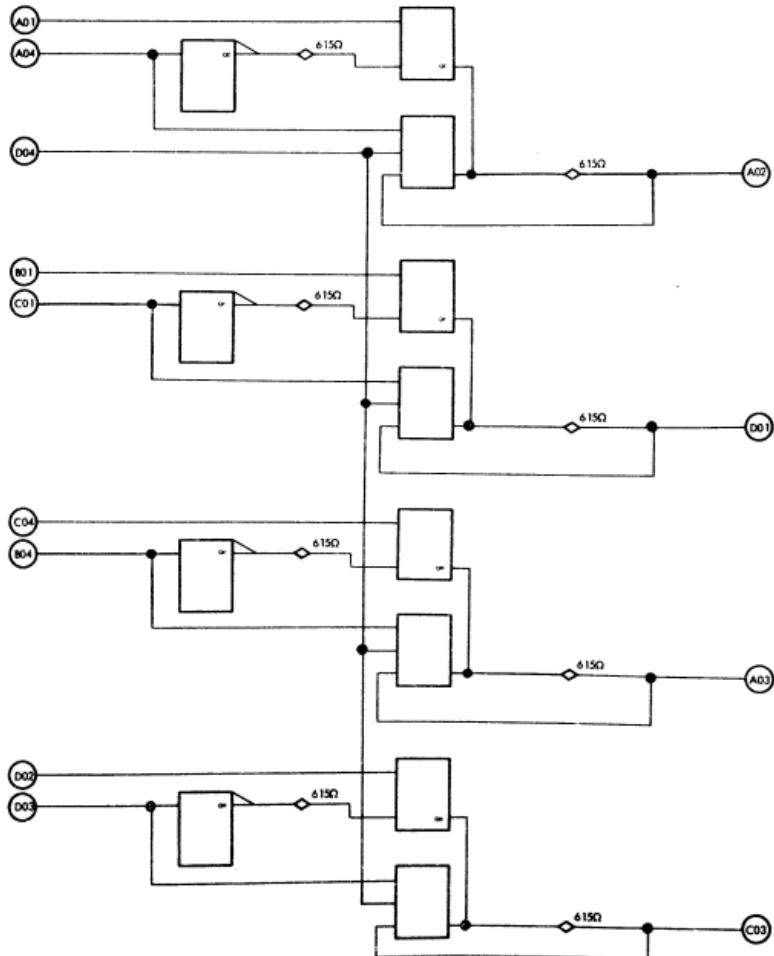
3 (2-3w AO) $\overline{\phi}$ 

Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413898
 Combined - NA
 Basic - AMA28

(4) Polarity Hold



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413899
Combined - NA
Basic - AFA28

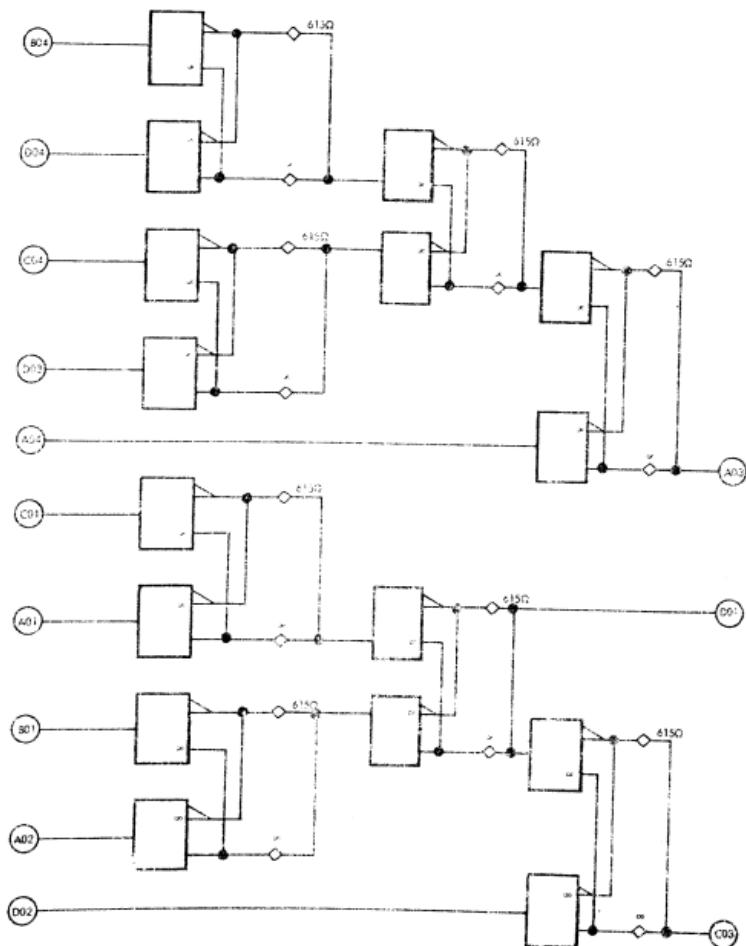
Notes for Module P/N 2551854 only.

Note 1 Pin D04 actually goes to 4 bases. Design Automation, however, has been told (via flyer) that this pin represents only 3 bases.

This representation is valid for AC wiring rule implementation only, and then only when the conditions stated below are fulfilled. It is the responsibility of the logic designer to assure himself that these conditions are met:

- a) Counting pin D04 as four loads, there are not more than ten loads on the net involved, and
- b) It is not necessary that the net, of which pin D04 is a part, reach its final condition until a time interval, t_o , has elapsed, after the beginning of a transition, where t_o is $3 \times L \times 0.17$ ns, where L is the total length of that net in inches.

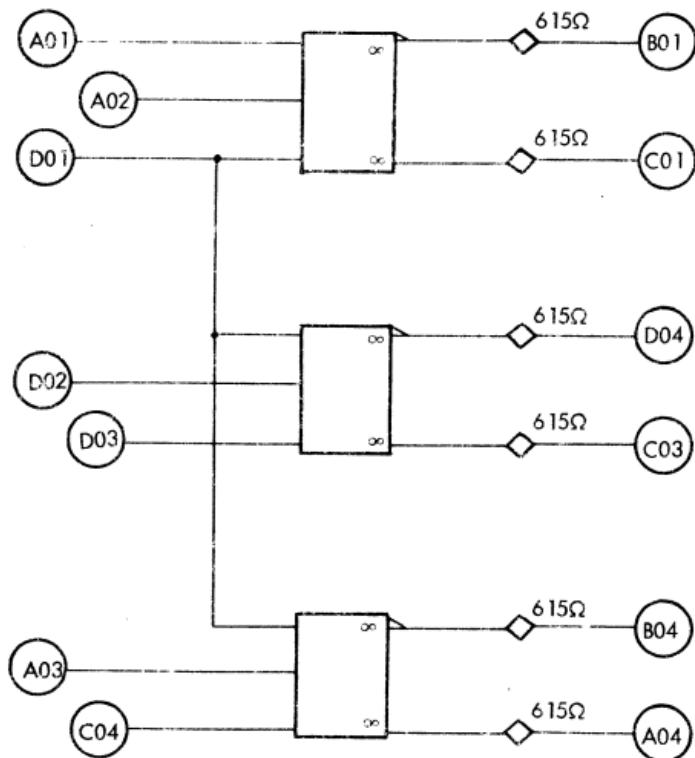
2 4w OE Parity Tree



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413900
Combined - NA
Basic - AUAES
- AUAE8

3 (3w both ϕ)

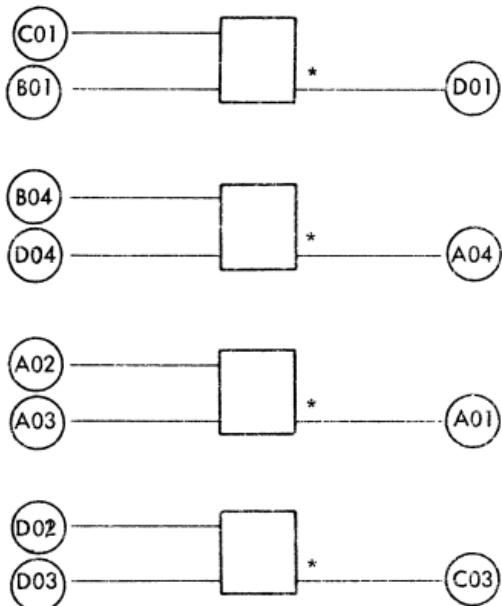
Circuit Flyers

B02 -3V
 B03 +1.25V
 C02 GND

Module - 2413901
 Combined - NA
 Basic - ALAA8

VII. (D) Logic Support Module Set

P/N 2541646 Multi-Purpose φ CS



*Special Clamp

Pd CASE IV = 92.3mw
ET-1 = 82.0mw

Circuit Flyers

MST-1

MST-2

B02	-3V	Module	- 2413869	Module	- NA
B03	+1.25V	Combined	- NA	Combined	- NA
C02	GND	Basic	- XLLGG	Basic	- NA

Module Part No: 2541646

Power Supplies Required: Standard MST-1 or MST-2

Input Levels: MST-1 or MST-2

Output Levels: Clamped Collector of Common Base Transistor

Description: This module provides four in-phase outputs, each output being the clamped collector of a common base stage. The clamp is implemented by a diode to +1.25V as shown schematically below.

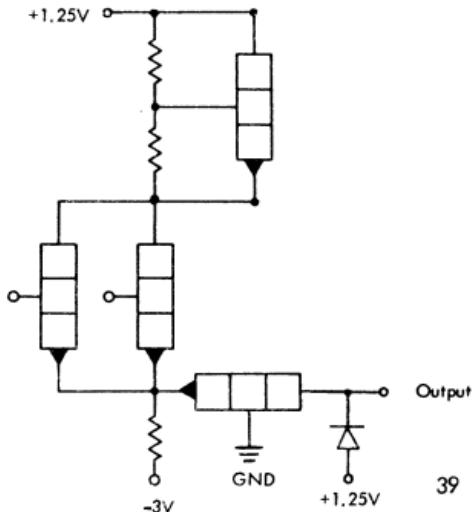
When used in conjunction with P/N 2551658, conversion can be made between MST-1 levels and SLT or NPL levels.* For MST-2 P/N 2551899 is required. The module can also be used as an indicator driver for the standard IBM SCRID assembly or other special applications

In general, this circuit provides a sink for current into the output. The maximum current the output will accept is 3.15ma. The maximum voltage which can be applied to the output of the circuit without component damage is:

Maximum Positive Voltage +3.25V
Maximum Negative Voltage +.535V

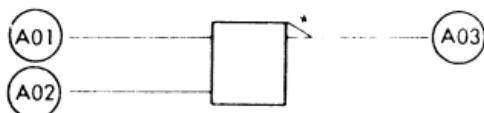
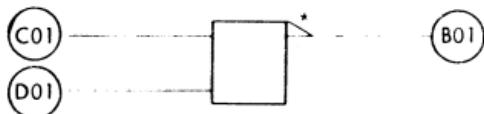
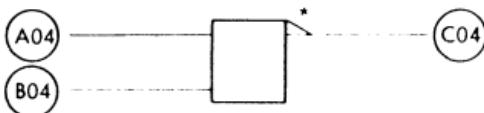
The input loading is equivalent to that of a standard logic block.

*See P/N 2551658
for NPL application



P/N 2531647

Multi-Purpose $\overline{\square}$ CS



*Special Clamp

Pd CASE IV = 160.0mw
ET-1 = 138.0mw

Circuit Flyers

MST-1

MST-2

B02 -3V	Module - 2413841	2413834
B03 +1.25V	Combined - NA	NA
C02 GND	Basic - XLHGG	ALHGG

Module Part No: 2531647

Power Supplies Required: MST-1 or MST-2

Input Levels: MST-1 or MST-2

Output Levels: Clamped collector of input transistor

Description: This module provides four out-of-phase outputs, each output being the clamped collector of the input transistor. The clamp is provided by two parallel diodes to +1.25V as shown schematically below.

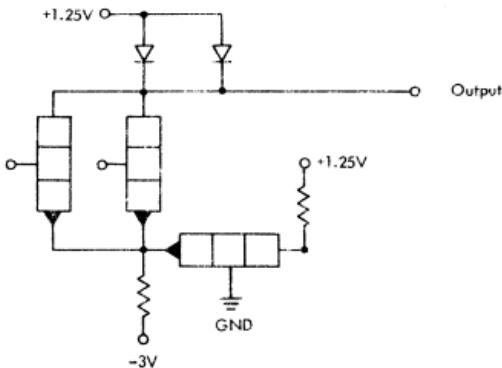
When used in conjunction with the module P/N 2551658, conversion can be accomplished between MST-1 levels and SLT or NPL levels.* For MST-2 use of P/N 2551899 is required.

The module can also be used as an indicator driver for the standard IBM SCRIB assembly or other special applications.

In general, the output provides a sink for current into the output. The maximum current the output will accept is 8.78ma. The maximum voltage which can be applied to the output terminal without component damage is:

Maximum Positive Voltage +3.25V
Maximum Negative Voltage +0.535V

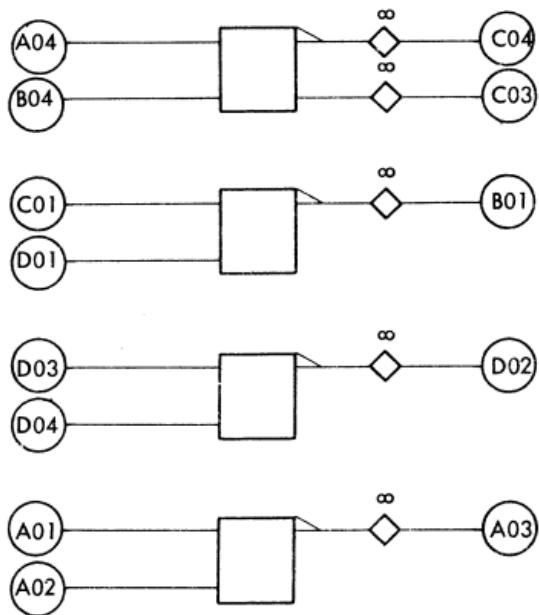
The input loading is equivalent to 2.2 times that for a standard logic block.



*See 2551658 for NPL application

MST-1 to MST-2 Converter

3-2w $\bar{\phi}$, 1-2w both ϕ



Circuit Flyers

B02 -4V
 B03 +1.25V
 C02 V_{REF} (MST-1)

Module - 2413992
Combined - NA
Basic - ALHCC

Module Part No: 2551648

Power Dissipation: CASE IV 220.3mw

ET-1 184.6mw

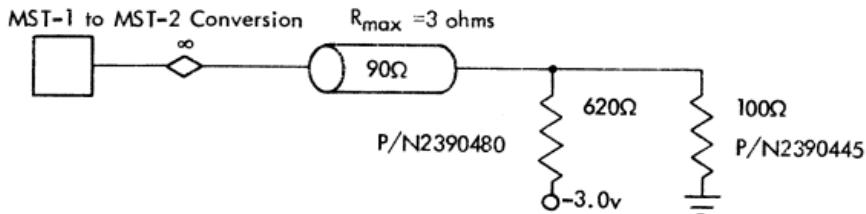
Power Supplies Required: MST-1 & MST-2

Input Level: MST-1

Output Level: MST-1 or MST-2

Description: In converter applications both MST-1 and MST-2 supply voltages are needed and the output levels are MST-2.

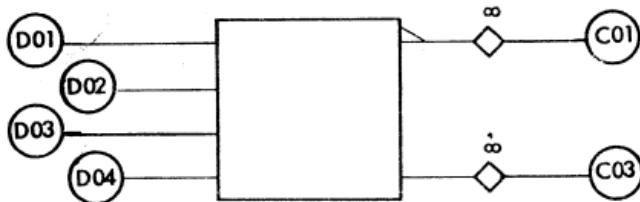
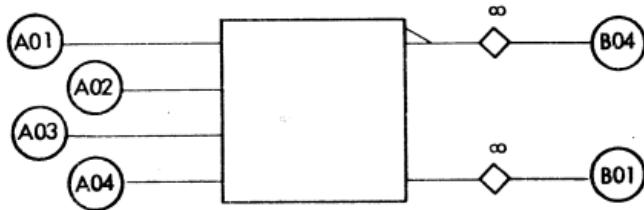
MST-1 to MST-2 Conversion



P/N 2541649

MST-1 to MST-2 Converter

2-4w both ϕ



Circuit Flyers

B02 -4V
B03 +1.25V
C02 V_{REF} (MST-1)

Module - NA
Combined - NA
Basic - NA

Module Part No: 2541649

Power Dissipation: CASE IV = 133.8mw; ET-1 = 113.7mw

Power Supplies Required: MST-1 and MST-2

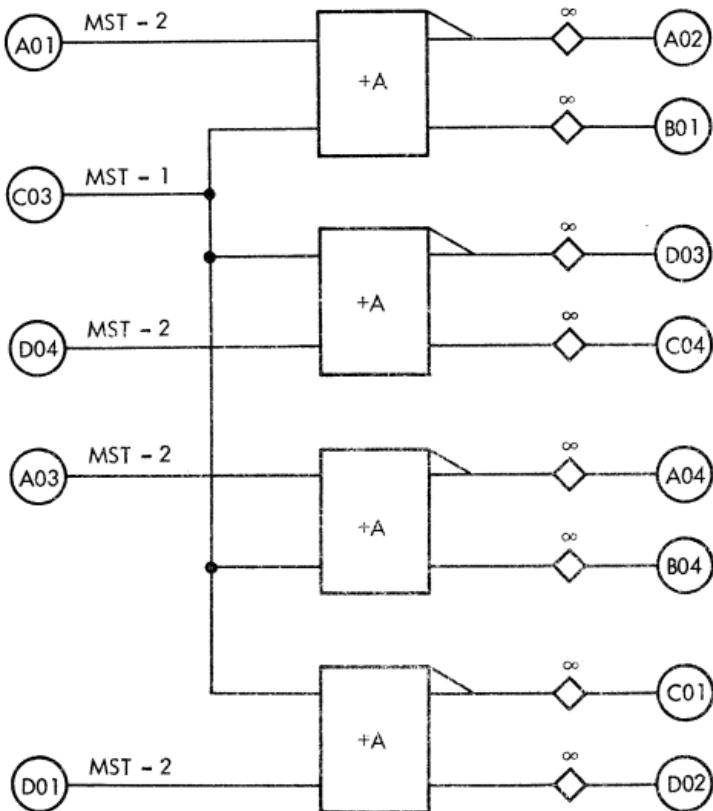
Input Levels: MST-1

Output Levels: MST-1 or MST-2

Description: In converter applications, both MST-1 and MST-2 supply voltages are needed, and the output levels are MST-2.

The circuits contained in this module are equivalent to those contained in module 2551648, the difference between the modules being circuit count and output options. The application and passive component requirements described for the 2551648 module are also applicable to this module.

MST-2 to MST-1 Converter



Circuit Flyers

B02 -4V
B03 GND
C02 V_{REF} (MST-1)

Module - 2413809
Combined - NA
Basic - PXVCC

Module Part No: 2551650

Power Dissipation: CASE IV = 282.8mW; ET-1 = 248.0mW

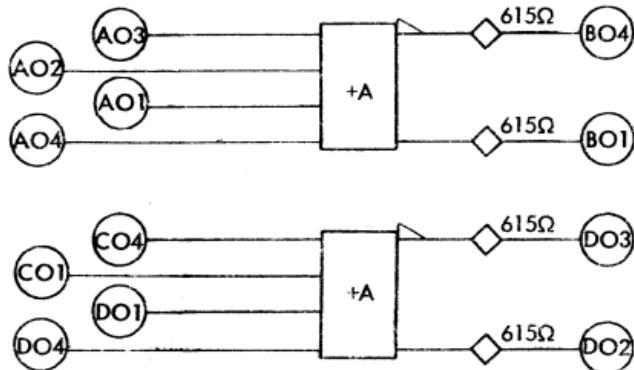
Power Supplies Required: Standard MST-1

Input Levels: MST-1 and MST-2

Output Levels: MST-1

Description: This module provides conversion from MST-2 to MST-1. Each of the four circuits performs a positive 'AND' function between the common MST-1 line, and an MST-2 line. The output emitter followers have standard MST-1 logic driving capability.

NPL/SLT To MST-1/MST-2 Converter



Pd CASE IV = 267.9mW
 ET-1 = 232.3mW

Circuit Flyers

	MST-2			MST-1	MST GEN
	MST-1	MST-4			
B02	-4V	-3V	Module	NA	NA
B03	GND	+1.25	Combined	XXAAB	PXAAD
C02	V REF	GND	Basic	PCAAH	PCAAH
				PCCCL	PCCCJ
				PCCCM	PCCCK

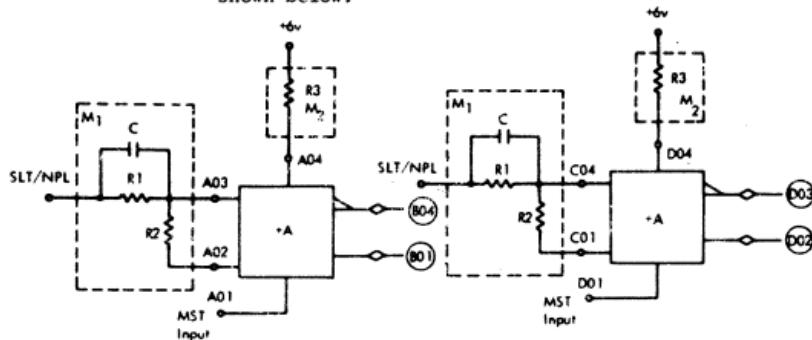
Module Part No: 2551651

Power Supplies Required: MST and +6.0 + 10%

Input Levels: MST, NPL, SLT

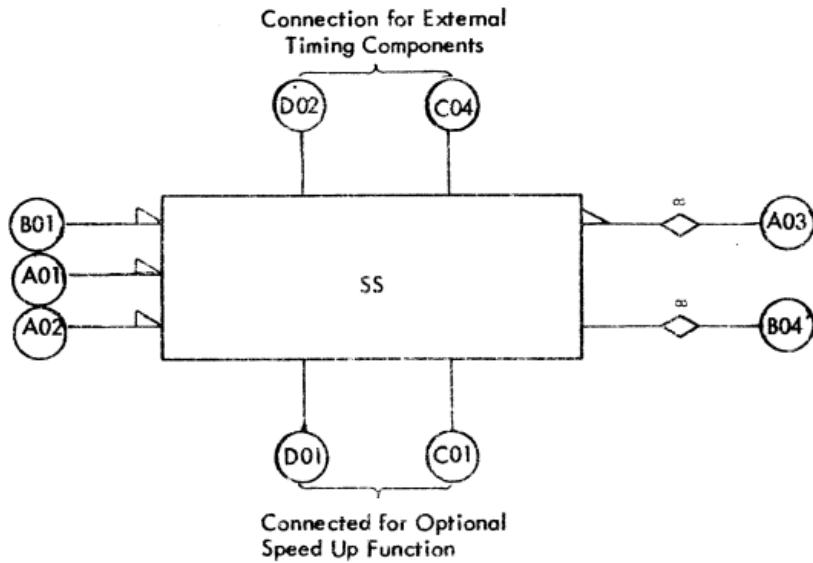
Output Levels: MST

Description: This module provides the conversion between the NPL interface or SLT and MST. Each module contains two convert functions which perform a "Positive And" function on the MST and NPL or SLT inputs. By appropriate selection of external R-FACs and R-C-PACs, this module can be used in MST-1, MST-2, or MST-4 systems. The circuits are connected to the external components as shown below:



	M ₂	M ₂
MST-1	P/N 2392344 R ₁ = 6.04KΩ R ₂ = 2.35KΩ C = 20 pf	P/N 2390525 R ₃ = 2.2KΩ
MST-2 and MST-4	NPL/SLT-30 P/N 2390399 R ₁ = 6.04KΩ R ₂ = 10KΩ C = 20 pf	P/N 2390507 R ₃ = 1.6KΩ
MST-2 and MST-4	SLT-10 P/N 2392357 R ₁ = 5.0KΩ R ₂ = 3.0KΩ C = 18 pf	P/N 2390507 R ₃ = 1.6KΩ

Single Shot



Pd CASE JV = 241.2mw
ET-1 = 206.0mw

Circuit Flyers

B02 -3V
D04 -3V
B03 +1.25V
C02 GND

Module	-- NA
Combined	- NA
Basic	- ASGAA - ASGAF - ASGAG - ASGAB - ASGAC - ASGAD

Module Part No: 2551652

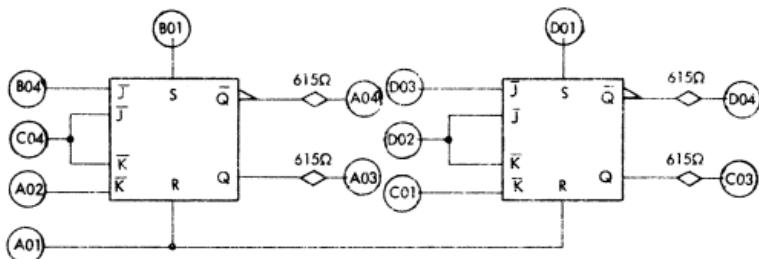
Power Supplies Required: MST-2

Input Levels: MST-2

Output Levels: MST-2

Description: Pulse width from 138ns to 1.19 seconds obtained by R.C. combinations. This is similar except for voltage assignments as noted in Section 19 Book 03-07 MST-1 Circuit Operation.

2 - A.C. Trigger



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413810
Combined - NA
Basic - PFSAA
- PFSAB
- PFSAC

Module Part No: 2551654

Power Dissipation: CASE IV = 281.8mW; ET-1 = 241.8mW

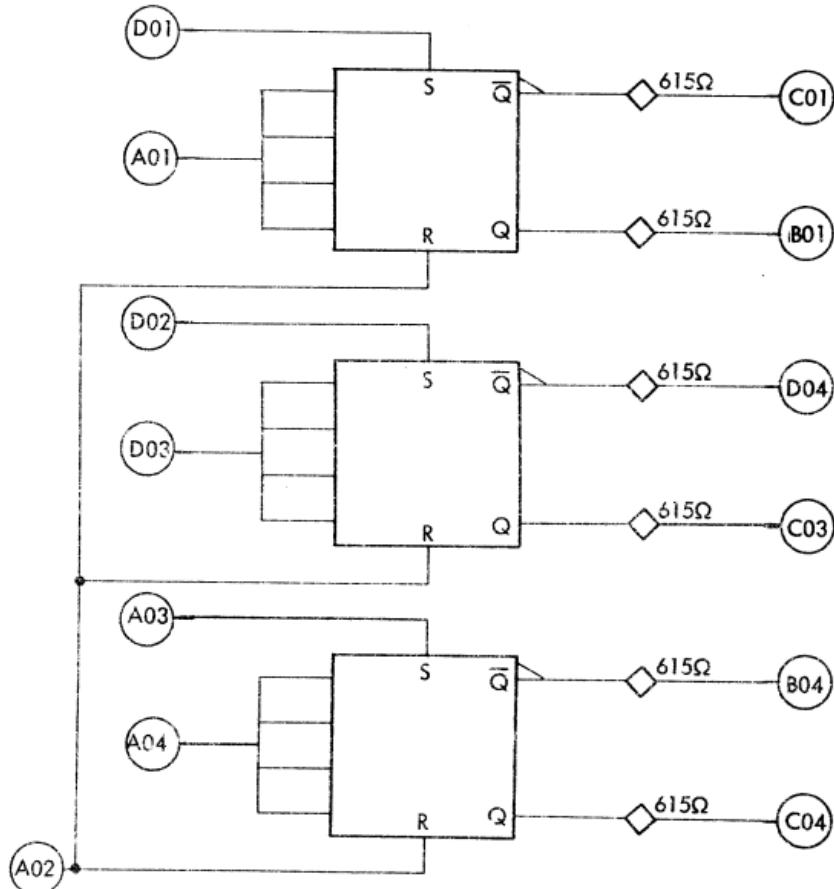
Power Supplies Required: MST-1 or MST-2

Input Levels: MST-1 or MST-2

Output Levels: MST-1 or MST-2

Description: Positive (one) inputs on a dc input will set or reset the trigger. To switch the trigger, both ac inputs on one side must be set to their down levels for a minimum conditioning time, followed by a positive transition of one or both inputs. The outputs can only drive unterminated lines in MST-2 environments.

3 - A.C. Trigger



Circuit Flyers

B02 -3V
B03 +1.25V
C02 GND

Module - 2413838
Combined - NA
Basic - PFSAA
- PFSAB
- PFSAC

Module Part No: 2551655

Power Dissipation: CASE IV = 422.7mW; ET-1 = 362.7mW

Power Supplies Required: MST-1 or MST-2

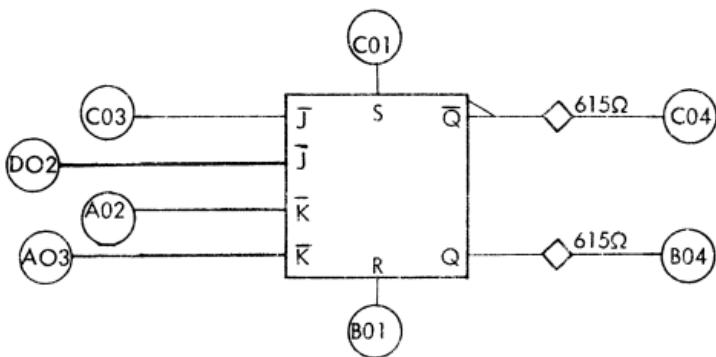
Input Levels: MST-1 or MST-2

Output Levels: MST-1 or MST-2

Description: This module contains three A.C. triggers with a common reset line. On each circuit all the A.C. inputs are tied together, enabling the circuit to be used as a counter element. A positive transition applied to the A.C. input will cause the output to switch states. Logical one inputs to the 'S' and 'R' lines will reset the circuit.

The output emitter followers have standard logic driving capabilities in MST-1, and can only drive unterminated lines in MST-2.

A. C. Trigger



Circuit Flyers

MST_{GEN}

B02 -3V
B03 +1.25V
C02 GND

Module - 2413837
Combined - NA
Basic - PFSAA
- PFSAB
- PFSAC

Module Part No: 2551656

Power Dissipation: CASE IV = 140.9mw; ET-1 = 120.9mw

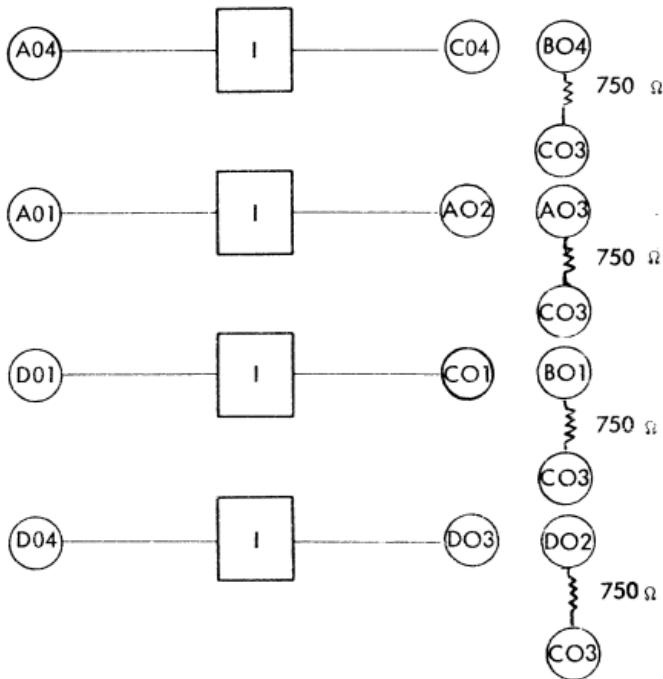
Power Supplies Required: MST-1 or MST-2

Input Levels: MST-1 or MST-2

Output Levels: MST-1 or MST-2

Description: For trigger description, see 2551654.

CS to NPL/SLT Converter



Pd:

Maximum - 284 mw
Nominal - 138 mw

C02 GND
C03 +6V

Circuit Flyers

Module - 2413803
- 2413842
Combined - NA
Basic - PXAAA
- PXAAB
- PCCBY
- PCCBZ
- PCCZZ
- PCAZZ

Module Part No: 2551658

Power Supplies Required: +6.0V \pm 10%

Input Levels: Output of MST-1 or MST-2 CS Module

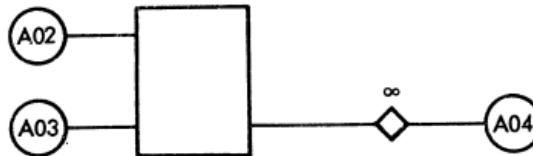
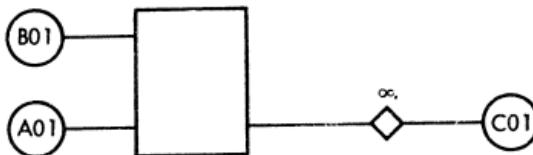
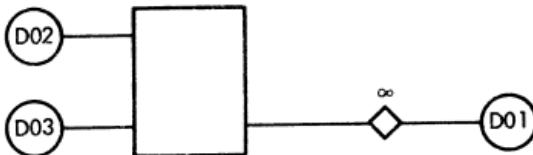
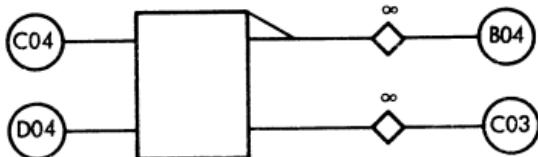
Output Levels: SLT

Description: This module provides the conversion between MST signal levels and SLT. When converting to SLT, this module is used in conjunction with either of the MST-1 modules (2531647, 2541646) or the MST-2 CS module (2551899). Conversion to NPL levels may be accomplished by the addition of an R-PAC (2390306) and a discrete transistor P/N 2391329 (Type 355) to the output of the SLT converter. (Refer to TEB 2-6400-100 section 16.5 for description of NPL conversion.)

The resistor shown in the block diagram is a programmable collector load for SLT applications.

MST-1 to MST-2 Converter

3-2w ϕ , 1-2w Both ϕ



Circuit Flyers

B02 -4V
B03 +1.25V
C02 V_{REF}

Module - NA
Combined - NA
Basic - NA

Module Part No: 2551665

Power Dissipation: CASE IV = 246.8mw; ET-1 = 214.0mw

Power Supplies Required: MST-1 or MST-1 & MST-2

Input Levels: MST-1

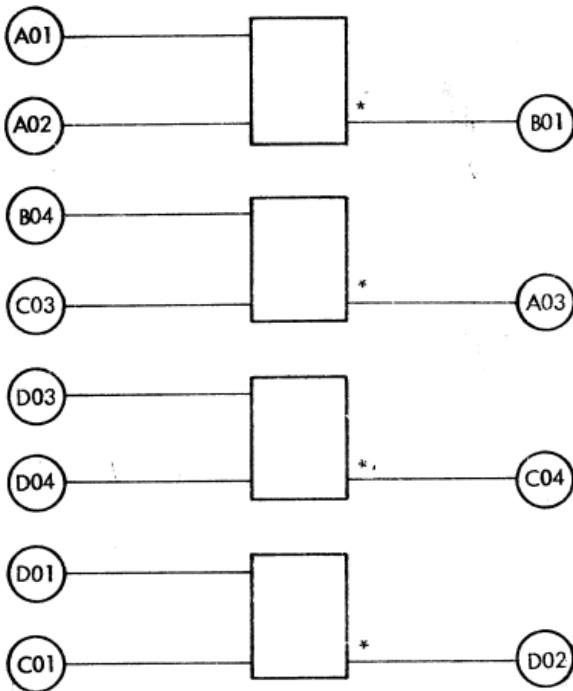
Output Levels: MST-1 or MST-2

Description: The circuits contained in this module provide an in-phase version of module P/N 2551648. The application and passive component requirements described for P/N 2551648 are applicable to this part number.

P/N 2551899

Multi-Purpose In-Phase CS

4 (2wφ)



Circuit Flyers

B02 -3V

Module - 2413847

B03 +1.25V

Combined - NA

C02 GND

Basic - AEAB8

*Note: Pins A03, B01, C04 and D02 are coded as
emitter outputs "E" for DA Program compatibility.
They are not standard emitter outputs.

Module Part No: 2551899

Power Supplies Required: Standard MST-2

**Output Levels: Clamped Collector of Common Base
Transistor**

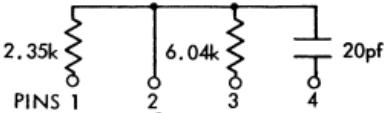
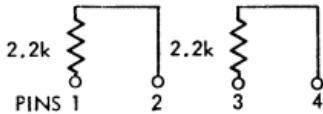
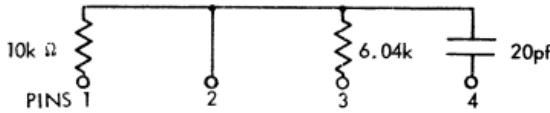
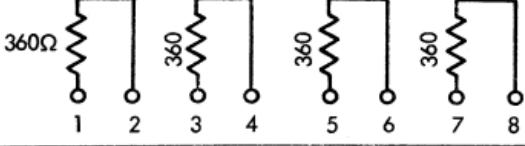
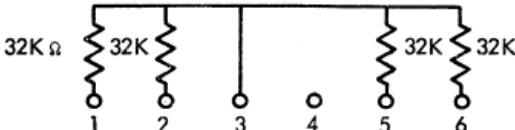
**Description: This module provides four in-phase
outputs.**

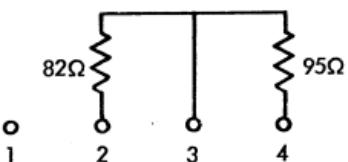
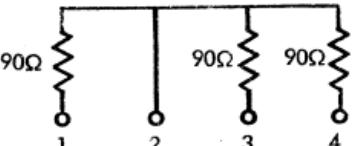
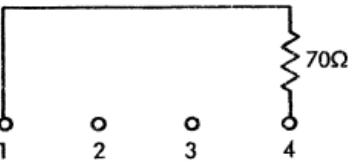
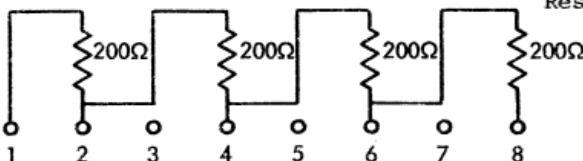
When used in conjunction with P/N
2551658, conversion is made between
MST-2 levels and SLT or NPL levels.
See P/N 2551658 for NPL application.

The input loading is equivalent to 2
times that for a standard logic block.

VIII. PASSIVE COMPONENT DESCRIPTIONS

P/N	Description	Where Used
2390381	Ref R Pac 615Ω All PINS 1 2 3 4	Ref R Pac for Standard Logic Circuits
2390383	2 Ref R Pac 1.23Ω All PINS 1 2 3 4	2 Ref R Pac for Standard Logic Circuits
2392338	MST-1 Line Terminator	MST-1 TLD
	4 200Ω 1 175Ω 200Ω 3 175Ω 2 1 3 4 2	TLD P/N 2551648 2541649 2551652 2551665 2551668
2390445	100Ω 100Ω 100Ω 1 2 3 4	1/2 of MST-1 to MST-2 Converter Line Terminator
2390480	620Ω 620Ω 620Ω 1 2 3 4	1/2 of MST-1 to MST-2 Converter Line Terminator

P/N	Description	Where Used
2392344		NPL/SLT to MST-1 Converter
		
2390525		NPL/SLT to MST-1 Converter
		
2390399		NPL/SLT to MST-2 Converter
		
2390507		NPL/SLT to MST-2 Converter
		
2390902		MST to Indicator
		
2392636		MST to Indicator
		

P/N	Description	Where Used
2390379		MST-2 Tie Up
2390380		MST-2 Line Terminator
2392627		NPL Terminating resistor
2390306		MST-2 to NPL
2390837		SLT-MST Terminating Resistor

IX. REFERENCES

Book Name	Book Number
MST-2 Circuit Operation	03-08
Packaging Ground Rules and Descriptions	03-10
Design Automation	00-04
MST-1 Circuit Operation	03-07